

1           **METHOD OF PRODUCING TRANSFER STICKERS WITH METAL**  
2           **POWDER AND TRANSFER STICKERS PRODUCED BY THE METHOD**  
3           **BACKGROUND OF THE INVENTION**

4           1. Field of the Invention

5           The present invention relates to a method of producing transfer stickers with  
6           metal powder, and more particularly to a method using electroplating processes to  
7           laminate metal powder on substrates to fabricate stickers having vivid patterns,  
8           wherein only the patterns can be transferred from the substrates. The present  
9           invention also relates to the structure of the stickers that are made in accordance with  
10          this method.

11          2. Description of Related Art

12          Many people like to put special patterns on objects even their bodies to  
13          improve the appearance, especially kids or teens concerned with current fashions.  
14          They use cartoon adhesive paper or tattoo stickers to decorate objects or their bodies.

15          Conventional methods of producing stickers use three kinds of procedures.

16          1. Gilding: As shown in Fig. 8, a base layer (60) made of a paper or plastic  
17          membrane is prepared, and then one side of the base layer (60) is coated with an  
18          adhesive layer (61). An isolating layer (62), which can be easily separated from the  
19          adhesive layer (61), covers the adhesive layer (61) to keep the adhesive layer (61)  
20          from sticking to other undesired places. A gilding layer (63) is printed on the other  
21          side of the base layer (60) in patterns. Finally, a cutter (not shown) is used to trim  
22          along a cutting line (64) around the gilding layer (63), i.e. the pattern, to make the  
23          gilding layer (63) detachable from other parts of the sticker.

24          2. Vaporizing: As shown in Fig. 9, a base layer (70) made of a paper or plastic

1 membrane is prepared, and then one side of the base layer (70) is coated with an  
2 adhesive layer (72). A laser pattern layer (71) is formed on the other side of the base  
3 layer (70) by vaporization to form patterns on the base layer (70). An isolating layer  
4 (73), which can be easily detached from the adhesive layer (72), is mounted on the  
5 adhesive layer (72) to keep the adhesive layer (72) from sticking to other undesired  
6 places. Finally, a cutter having specific shape cuts along a cutting line (74) so the laser  
7 pattern layer (71) can be separated from the isolating layer (73).

8         3. Etching: as shown in Fig. 10, a base layer (82) made of nylon is prepared,  
9 and then one side of the base layer (82) is coated with an adhesive layer (81). An  
10 isolating layer (80), which can be easily detached from the adhesive layer (81), is  
11 attached to an exposed side of the adhesive layer (81) to keep the adhesive layer from  
12 sticking to other undesired places. A metal powder layer (83) coats the other side of  
13 the base layer (82) by vaporization to cover the whole surface of the base layer (82).  
14 An ink layer (84) is printed on the metal powder layer (83) in a specific pattern, and  
15 then an acid solution is used to etch the metal powder layer (83) not covered with the  
16 ink layer (84) to form patterns on the base layer (82). After etching, the ink layer (84)  
17 is removed from the metal powder layer (83) by a washing process to complete the  
18 sticker. When the sticker is used, the adhesive layer (81) is detached from the isolating  
19 layer (80), and then the whole base layer (82) with the emerged patterns is attached to  
20 a desired place.

21         Stickers made using the first and second methods have inaccurate boundaries  
22 around the patterns because the cutter is often not precisely matched with the cutting  
23 lines (64, 74) around the patterns. Therefore, the pattern may be partially cut out, or  
24 margins may be left around the patterns to make the sticker coarse.

1           As to the third method, the patterns and other parts of the sticker such as the  
2 base layer (82) must be attached to objects to transfer the patterns. Thus, such a sticker  
3 is also coarse for decoration.

4           The present invention has arisen to mitigate and/or obviate the disadvantages  
5 of the conventional method of producing transfer stickers.

#### 6 SUMMARY OF THE INVENTION

7           A main objective of the present invention is to provide a method of producing  
8 transfer stickers with metal powder by electroplating processes, wherein only the  
9 desired patterns are transferred to objects.

10          Further benefits and advantages of the present invention will become  
11 apparent after a careful reading of the detailed description with appropriate reference  
12 to the accompanying drawings.

#### 13 BRIEF DESCRIPTION OF THE DRAWINGS

14          Fig. 1 is a flow chart of a method of producing transfer stickers with metal  
15 powder in accordance with the present invention;

16          Fig. 2 is a perspective view in partial section of a sticker in accordance with  
17 the present invention, wherein a shaped resin layer is mounted on a metal powder  
18 layer;

19          Fig. 3 is a perspective view in partial section of the sticker in accordance with  
20 the present invention after etching the metal powder layer;

21          Fig. 4 is a perspective view of the sticker in accordance with the present  
22 invention with a protecting layer mounted on the patterns;

23          Fig. 5 is a perspective view of the sticker in accordance with the present  
24 invention with an adhesive layer attached to the protecting layer;

Fig. 6 is a cross-sectional side plan view of the sticker along line 6-6 in Fig. 5;  
Fig. 7 is a top plan view of the sticker in Fig. 5 showing the patterns transferred to a desired surface;

Fig. 8 is a cross-sectional side plan view of a first conventional type of sticker;

Fig. 9 is a cross-sectional side plan view of a second conventional type of sticker; and

Fig. 10 is a cross-sectional side plan view of a third conventional type of sticker.

#### DETAILED DESCRIPTION OF THE INVENTION

With reference to Figs. 1 to 7, a method of producing transfer stickers with metal powder in accordance with the present invention comprises the steps of (a) coating a substrate with a first isolating layer; (b) coating the first isolating layer with a resin layer; (c) coating the resin layer with a metal powder layer by an electroplating process; (d) printing a first protecting resin layer pattern on the metal powder layer; (e) etching the metal powder layer not covered by the first protecting resin layer to for shape and to cause the patterns to protrude by acid or base etching reagents; (f) washing away the etching reagents; (g) printing a second protecting resin layer on the first protecting resin layer to protect the patterns in shape; (h) printing an adhesive layer on the second protecting resin layer; and (i) attaching a second isolating layer to the adhesive layer.

Whereby, a transfer sticker with metal powder is completed.

In step (a), a substrate (10) is prepared and a first isolating layer (11) is coated on the substrate (10). The first isolating layer (11) enables to be easily detached from

the substrate (10).

In step (b), coating said first isolating layer (11) with a resin layer (12) having vivid colors, the resin layer (12) is transparent or selectively dyed in some light colors or has colorful powder visibly contained inside so as to make the resin layer (12) have an attractive appearance.

In step (c), coating the resin layer (12) with a metal powder layer (13) by an electroplating processes and then pressing the metal powder layer (13) with a molding machine to form light-reflecting laser patterns on the metal powder layer (13).

In step (d), a first protecting resin layer (14) is printed on the metal powder layer (13) in specific shapes to cover the metal powder layer (13).

Then, in step (e), etching reagents such as an acid solution or base solution is used to etch the metal powder layer (13) that is not covered by the first protecting resin layer (14) to make the patterns protrude. An acid solution has better etching efficiency than a base solution.

In step (f), the sticker is washed with water until the etching reagents are completely removed.

In step (g), a second protecting resin layer (15) coats the first protecting resin layer (14) to emphasize and protect a clear configuration or shape of the patterns.

In step (h), an adhesive layer (16) is printed on the second protecting resin layer (15) so that the transfer sticker can be attached to an object.

In the last step (i), an isolating layer (17) that is easily detached from the adhesive layer (16) is attached on the adhesive layer (16) for protection. Multiple split lines (18) are formed around roots of the patterns to easily detach the patterns from the first isolating layer (11) with part of the resin layer (12). Then, the transfer sticker

1 with metal powder is completed.

2 The substrate (10) is made of materials selected from paper or plastic  
3 membrane that can be combined with the isolating layer (11). The isolating layer is  
4 made of wax, silicon or other materials easily separated from the substrate (10) after  
5 they solidify. Additionally, the resin layer (12), the first protecting resin layer (14) and  
6 the second protecting resin layer (15) are all made of resin.

7 Before washing in step (f), a neutralizing reagent that has nullifying  
8 properties to the corrosive solutions is used to moderate the corrosive solutions. For  
9 example, when the corrosive solution is acid, a base neutralizing reagent is used to  
10 neutralize the acid corrosive solution. Then, all reagents and solutions are washed and  
11 removed from the sticker by water.

12 The second protecting resin layer (15) in step (h) coating the first protecting  
13 resin layer (14) has an equal or larger area than the first protecting resin layer's (14)  
14 area. The second protecting resin layer (15) can be composed of multiple layers and at  
15 least one of the multiple layers of the second protecting resin layer (15) is mixed with  
16 colors to make the second protecting resin layer (15) have a vivid appearance.  
17 Additionally, the at least one of the multiple layers can be mixed with fluorescence  
18 materials to make the second protecting resin layer (15) have luminance or be mixed  
19 with colorful bright powders to make the second protecting resin layer (15) shine and  
20 sparkle.

21 To apply the transfer sticker to an object, the isolating layer (17) is removed  
22 from the adhesive layer (16) to expose the adhesive. Thus, the patterns composed of  
23 the second protecting resin layer (15), the first protecting resin layer (14), the metal  
24 powder layer (13), and the resin layer (12) can be stuck on surfaces (19) of an object

1 by the adhesive layer (16). After being attached to a surface (19) of an object, the first  
2 isolating layer (11) is detached from the resin layer (12) within the split line (18). The  
3 adhesive force between the adhesive layer (16) and the object is greater than the  
4 attractive force between the resin layer (12) and the first isolating layer (11) so that the  
5 patterns can be easily stuck and transferred to other objects from the first isolating  
6 layer (11).

7         Only the patterns are transferred to the objects without other residual parts of  
8 the transfer sticker, as shown in Fig. 7. The resin layer (12), the first protecting resin  
9 layer (14) and the second protecting resin layer (15) are colored and coated around the  
10 metal powder layer (13) to increase versatility of the transfer sticker and to protect the  
11 metal powder layer (13). Thus, the transfer sticker is trimmed, exquisite and  
12 attractive.

13         Although the invention has been explained in relation to its preferred  
14 embodiment, it is to be understood that many other possible modifications and  
15 variations can be made without departing from the spirit and scope of the invention as  
16 hereinafter claimed.